Amendments to the Specification:

Please amend the paragraph starting at page 1, line 10 and ending at page 2, line 5 to read, as follows.

An image forming apparatus is generally provided, as shown in Fig. 8, with a photosensitive drum 10 constituting a latent image bearing member, a charging apparatus 11 constituting charging means which uniformly charges the photosensitive drum, an exposure apparatus 12 for applying an imagewise exposure to the uniformly charged photosensitive drum thereby forming an electrostatic latent image, a developing apparatus 13 for developing the electrostatic latent image with a toner, constituting a developer, thereby obtaining a visible toner image, a transfer apparatus 15 constituting transfer means which transfers the toner image, present on the photosensitive drum, onto a transfer material 14 constituting a transfer medium, a fixing apparatus 16 for fixing the toner image on the transfer material, and a cleaning apparatus 17 constituting cleaning means which scrapes off [[a]] toner remaining on the photosensitive drum 10. The photosensitive drum 10, the charging apparatus 11, the developing apparatus 13 and the cleaning apparatus 17 are often constructed as a process cartridge, detachably mounted on a main body of the image forming apparatus.

Please amend the paragraphs starting at page 2, line 13 and ending at page 3, line 6 to read, as follows.

When a detachable process cartridge is inserted into a main body of the image forming apparatus and a power supply therein is turned on, a main motor is activated to initiate an initial multi-rotation ~~multi rotation~~ step. This step executes a detection of

presence/absence of the process cartridge, and a cleaning of a transfer roller (toner attached on the transfer roller being discharged onto the photosensitive drum).

After the initial multi-rotation ~~multi rotation~~ step, the image forming apparatus moves a stand-by state. When image information is supplied from output means such as an unillustrated host computer to the image forming apparatus, the main motor drives the main body of the image forming apparatus thereby entering an initial rotation step. This step executes preparatory operations for printing in various process devices, principally including a preliminary charging of the photosensitive drum, a start-up of a laser scanner, a determination of a transfer voltage in the image formation, and a temperature regulation of the fixing apparatus.

Please amend the paragraph starting at page 3, line 26 and ending at page 4, line 7 to read, as follows.

For the charging apparatus 11, there is widely employed a contact charging method of maintaining a charging apparatus of a roller or blade shape into contact with the surface of the photosensitive drum and applying a voltage to the charging apparatus thereby charging the surface of the photosensitive drum. In particular, the charging method of roller type can achieve a stable charging over a prolonged period.

Please amend the paragraph starting at page 8, line 5 and ending at page 8, line 10 to read, as follows.

Therefore, it is proposed, as described in US Patent Application Publication No. 2003219268, to provide a stable discharge current by a charging bias supply circuit

involving single voltage-elevating means, not dependent on the environment of use. Such a configuration will be explained in the following.

Please amend the paragraphs starting at page 9, line 2 and ending at page 9, line 8 to read, as follows.

Such charging bias voltage control allows ~~to obtain~~ a substantially constant current behavior to be obtained, ~~behavior,~~ as in a constant current control, independent from a change in the impedance in the charging roller, the photosensitive drum etc.

Such a charging voltage control method will be called a peak-to-peak voltage selection control.

Please amend the paragraph starting at page 9, line 18 and ending at page 10, line 2 to read, as follows.

A foreign substance such as the transfer residual toner is usually scraped off in a post-rotation step after an image formation. However, if a deposited foreign substance is in a state not easily separable from the surface of the photosensitive drum, a polishing in the post-rotation step and an initial rotation step in a next job may be insufficient for removing the [[such]] foreign substance. A printing process executed with an uneliminated foreign substance may result in an image defect resulting from such a foreign substance. A following phenomenon is an example of such situation.

Please amend the paragraphs starting at page 11, line 2 and ending at page 11, line 19 to read, as follows.

Since the deposited foreign substance 19 is scraped off little-by-little ~~little by little~~ by the cleaning blade 17, the white streak image is most conspicuous in a first print where the amount of the foreign substance is largest, then, in a continuous use, becomes progressively less conspicuous in a second print, a third print and so forth since the foreign substance is gradually scraped off, and eventually vanishes completely as the foreign substance is eventually removed completely.

Therefore, this phenomenon can be resolved by extending a rotation time of the photosensitive drum prior to the image formation. An extension of the rotation time of the photosensitive drum before the image formation increases the chance that the position with a deposited foreign substance passes under the cleaning blade, thereby completely eliminating the foreign substance eventually.

Please amend the paragraph starting at page 13, line 8 and ending at page 13, line 10 to read, as follows.

Fig. 4 is a flowchart ~~flow chart~~ showing an operation sequence of the image forming apparatus of the embodiment 1;

Please amend the paragraph starting at page 13, line 13 and ending at page 13, line 15 to read, as follows.

Fig. 7B is a flowchart ~~flow chart~~ showing steps before the start of an initial rotation in the embodiment 2;

Please amend the paragraph starting at page 13, line 18 and ending at page 13, line 19 to read, as follows.

Fig. 9 is a flowchart ~~flow chart~~ showing an operation sequence of the prior image forming apparatus;

Please amend the paragraph starting at page 16, line 4 and ending at page 16, line 19 to read, as follows.

The charging roller 11 constituting the charging means is pressed toward a center of the photosensitive drum 10, and is rotated by the rotation thereof. The charging roller 11 is given a charging bias voltage from an unillustrated charging bias supply circuit, to be explained later. The charging bias voltage employs a method of superposing a DC voltage Vdc corresponding to a desired potential Vd on the drum with an AC voltage having a peak-to-peak voltage (Vpp) equal to or higher than a discharge starting voltage. Such a charging method intends, by superposing a DC voltage and an AC voltage, to resolve local potential unevenness on the photosensitive drum, and to uniformly charge the photosensitive drum to a potential Vd equal to the applied DC voltage Vdc.

Please amend the paragraph starting at page 19, line 24 and ending at page 20, line 4 to read, as follows.

The undercoat layer 10b is provided for the purposes of improving adhesion of the charge generation layer, improving a coating property, protecting the substrate, covering a defect on the substrate, improving a charge injecting property from the substrate and

protecting the photosensitive layer from [[an]] electrical destruction, and has a thickness of about 0.2 to 2.0 μm.

Please amend the paragraphs starting at page 20, line 23 and ending at page 21, line 7 to read, as follows.

(1) Initial multi-rotation ~~multi rotation~~ step

When a power supply is turned on in the main body of the image forming apparatus, a main motor is activated to initiate an initial rotation, thereby initializing the image forming apparatus (such step being hereinafter called initial multi-rotation). ~~multi rotation).~~ The initial multi-rotation ~~multi rotation~~ is executed when the power supply is turned on, and, in case a print signal is supplied to the image forming apparatus in a stand-by state after a printing process, the operation is started from an initial rotation step to be explained next.

Please amend the paragraph starting at page 23, line 14 and ending at page 24, line 10 to read, as follows.

The charging bias voltage source 1 applies a first AC voltage for the peak-to-peak voltage selection control (hereinafter called a peak-to-peak voltage selecting bias). The charging bias voltage source applies a charging bias voltage to the charging roller 11, utilizing the voltage-elevating means T1 etc., and selecting the peak-to-peak voltage selecting bias as Vpp-1, Vpp-2,..., Vpp-n, Vpp-(n+1),.. (wherein the peak-to-peak voltages have a magnitude relationship of Vpp-1 > Vpp-2 >...> Vpp-n > Vpp-(n+1) >..). In response an AC current Iac flows to a ground terminal GND through the charging roller 11

and the photosensitive drum 10. An AC current detection circuit 9, constituting AC current detection means, executes a sampling, in such AC current, of an AC current having a frequency which is the same as a charging frequency by an unillustrated filter circuit formed by a resistor and a capacitor, and converts it into a detection voltage V which is supplied to an engine controller. Thus the detection voltage V is entered, as information based on the AC current amount, into the engine controller. The detection voltage V, sampled at a predetermined period, is averaged in the engine controller.

Please amend the paragraphs starting at page 25, line 4 and ending at page 27, line 8 to read, as follows.

4-2) Peak-to-peak voltage selection control for charging AC voltage in initial rotation at the start of power supply (initial multi-rotation) ~~multi rotation)~~

When a power supply is turned on in the main body of the image forming apparatus, a main motor is activated to initiate an initial rotation (such step being hereinafter called initial multi-rotation). ~~multi rotation).~~ In this state, the engine controller of the main body of the image forming apparatus applies all the applicable AC voltages with different peak-to-peak voltages or a part thereof to the charging roller, and executes such a control as to use, as the AC voltage for image formation, an AC voltage having a minimum peak-to-peak value for which a detection voltage obtained from an AC current flowing from the charging roller to the photosensitive drum is equal to or larger than the peak-to-peak voltage selection control threshold value V0. For example, AC voltages are applied in an increasing order of the peak-to-peak voltage, such as Vpp-(n+2), Vpp-(n+1), Vpp-n, and Vpp-(−1) (magnitude of the peak-to-peak values of the AC voltages being Vpp-

(n+2) < Vpp-(n+1) < Vpp-n < Vpp-(–1)). Since the magnitude of Vpp corresponds to that of the corresponding current Iac and that of the voltage detected by the AC current detection circuit, the respectively detected voltages Vn+2, Vn+1, Vn and Vn-1 assume a magnitude relationship of Vn+2 < Vn+1 < Vn < Vn-1. In case a relation Vn+2 < Vn+1 < V0 < Vn < Vn-1 is obtained in connection with the peak-to-peak voltage selection control threshold value V0 for the charging AC voltage, the peak-to-peak voltage for the charging AC voltage at image formation is selected at Vpp-n. Stated differently, Vn+2 or Vn+1 does not provide a detection voltage equal to or larger than the peak-to-peak voltage selection control threshold value V0 for the charging AC voltage, but Vn or Vn-1 provides a detection voltage equal to or larger than the peak-to-peak voltage selection control threshold value V0 for the charging AC voltage. Vn is selected because it is the AC voltage having the minimum peak-to-peak value among Vn and Vn-1. The detection voltage may also be obtained by averaging detection voltages of plural times. In this manner, in the initial multi-rotation ~~multi-rotation~~ step, there is provided a first peak-to-peak voltage selecting step for selecting a peak-to-peak voltage capable of reaching a minimum necessary current enabling a uniform charging. Such a step allows a correction to an optimum peak-to-peak voltage at the start of power supply. In the foregoing explanation, for the ease of understanding, the detection voltage is determined up to Vn-1 beyond the peak-to-peak voltage selection control threshold value V0 for the charging AC voltage, but the first peak-to-peak voltage selecting step may naturally be terminated as soon as the detection voltage Vn, equal to or larger than the peak-to-peak voltage selection control threshold value V0 for the charging AC voltage is obtained.

Please amend the paragraph starting at page 28, line 5 and ending at page 28, line 20 to read, as follows.

The peak-to-peak voltage selection control for the charging AC voltage is preferably executed also in the initial rotation step prior to the image formation. This is because, in case the peak-to-peak voltage selection control for the charging AC voltage is executed only in the initial multi-rotation ~~multi rotation~~ step at the start of power supply, an appropriate peak-to-peak voltage selection is not at all executed in an image forming apparatus not provided with the initial multi-rotation ~~multi rotation~~ step (for example an image forming apparatus of which power supply is always turned on). However, the peak-to-peak voltage selecting step in the initial multi-rotation ~~multi rotation~~ step, explained in the foregoing 4-2 voltage selection control), [[4-2),]] involves successive applications of the peak-to-peak voltage selecting biases and requires a time.

Please amend the paragraphs starting at page 29, line 2 and ending at page 29, line 23 to read, as follows.

Therefore, in the peak-to-peak voltage selection control after the initial multi-rotation ~~multi rotation~~ step, it is possible, by selecting a peak-to-peak voltage smaller than the peak-to-peak voltage selected in the preceding image formation as the peak-to-peak voltage selecting bias, to achieve a reduction in the control time in comparison with the peak-to-peak voltage selecting step in the initial multi-rotation ~~multi rotation~~ step, as

explained in the foregoing 4-2 voltage selection control). [[4-2).]] Thus, in the initial rotation step, there is provided a second peak-to-peak voltage selecting step for selecting a peak-to-peak voltage before reaching the minimum necessary current required for charging.

In the initial rotation step, the selection of the peak-to-peak charging voltage is executed in a following procedure. Referring to Fig. 6, taking the peak-to-peak voltage for the image formation, determined in the peak-to-peak voltage selecting method for the charging AC voltage in the initial multi rotation step, as explained in the foregoing voltage selection control), [[4-2),]] as Vpp-n, the initial rotation step applies only a voltage Vpp-(n+1) which is lower than Vpp-n by one step.

Please amend the paragraphs starting at page 30, line 26 and ending at page 32, line 25 to read, as follows.

When the main motor is stopped after the image formation, a foreign substance such as a transfer residual toner remaining principally in a contact position of the cleaning blade on the photosensitive drum causes a white streak image, uniform in the longitudinal direction, in a next image formation. In order to avoid such a phenomenon, it is possible to extend the initial rotation time as in the prior technology, but the present embodiment applies, as a bias for eliminating the foreign substance, a second AC voltage (hereinafter called a foreign substance eliminating bias) having a peak-to-peak voltage larger than the peak-to-peak voltage of the peak-to-peak voltage selecting bias. The application of such a foreign substance eliminating bias increases the discharge current to the photosensitive drum, thereby facilitating a cleavage of a chain connecting molecules on the surface of the photosensitive drum. Consequently a resin constituting the surface of the photosensitive

drum is modified toward a lower molecular weight, and becomes more easily scrapable with the cleaning blade, so that the foreign substance deposited on the drum surface is also eliminated. As explained in the foregoing, the AC voltage for charging the image forming area is selected at a minimum necessary peak-to-peak voltage by the peak-to-peak voltage selection control. Also, for the aforementioned reason, the peak-to-peak voltage of the peak-to-peak voltage selecting bias is smaller than the peak-to-peak voltage of the AC voltage for charging the image forming area. Consequently, the peak-to-peak voltage selecting bias is not effective for eliminating the foreign substance. Therefore, the bias for foreign substance elimination is applied only in a partial time, such as the initial rotation, thereby eliminating the foreign substance prior to the image formation. The foreign substance eliminating bias is applied for at least a turn of the photosensitive drum, preferably for three turns of more. Also the foreign substance eliminating bias is preferably a peak-to-peak voltage of a maximum AC voltage applicable to the charging roller by the charging bias supply source.

Such a foreign substance eliminating bias is preferably applied in a non-image forming area. More preferably it is applied in an initial rotation step immediately before the image formation. As the foreign substance deposited and becoming not easily removable at the end of a preceding job is effectively eliminated by the foreign substance eliminating bias before the start of the next image formation, so that the surface of the photosensitive drum is refreshed immediately before the image formation and can always provide a satisfactory image.

Please amend the paragraph starting at page 34, line 5 and ending at page 34, line 21 to read, as follows.

Then, as a comparative example 1, there was considered a case of inverting the order of applications as shown in Fig. 2B, namely applying the foreign substance eliminating bias at first (S6-S7) and then executing the peak-to-peak voltage selecting step (S7-S8). In such case, the potential Vd on the photosensitive, which is stabilized during the application of the foreign substance eliminating bias (S6-S7), becomes unstable in the peak-to-peak voltage selecting step (S7-S8). In order to avoid such situation, the image formation may be started after applying a charging AC voltage for image formation during an additional turn (S8-S9) of the photosensitive drum thereby achieving a preliminary charging (S9), but such a method requires an extension of the initial rotation step by a time T5, thus requiring an additional time for image formation.

Please amend the paragraph starting at page 39, line 5 and ending at page 39, line 18 to read, as follows.

The sequence of charging and transfer in the present embodiment will be explained. During the initial rotation step, the peak-to-peak voltage selection for the charging AC voltage is executed at first and the application of the foreign substance eliminating bias is executed later as in the example 1. The present embodiment is characterized in that a positive transfer voltage for controlling the transfer voltage is applied after an area of the photosensitive drum, charged by the foreign substance eliminating bias, arrives at a contact portion with the transfer apparatus (transfer position). In the following description, portions which are the same as those in the embodiment 1 will be omitted.

Please amend the paragraphs starting at page 40, line 6 and ending at page 42, line 3 to read, as follows.

Referring to Fig. 14A showing the configuration of the embodiment 2, the potential on the photosensitive drum does not reach the desired value during the peak-to-peak voltage selecting step (S2-S3), but becomes stabilized to the desired value when the foreign substance eliminating bias Vpp-1 is applied, so that the image formation can be started immediately after (S4) the end of application of the foreign substance eliminating bias Vpp-1. During the peak-to-peak voltage selecting step (S2-S3) for the photosensitive drum, as the positive transfer voltage is not applied, the photosensitive drum is prevented from a situation where it is charged positively by the transfer voltage thereby generating a memory in the photosensitive layer on the surface of the photosensitive drum. Also as an application of a positive voltage for transfer voltage control is executed in an area having a stable potential Vd on the photosensitive drum, the transfer voltage control can be executed in a more stable manner. In the present embodiment, a weak transfer bias for the transfer voltage control is applied (S3-S4) in [[all]] the <u>entire</u> area where the foreign substance eliminating bias is applied, but it may also be applied in a part of the area where the foreign substance eliminating bias is applied.

In a comparative example 2, a positive transfer voltage (weak bias) is applied, for the transfer control as in ATVC, during the peak-to-peak voltage selecting step (S7-S8) as shown in Fig. 14B. In this case, since the positive transfer voltage is applied in an area having an unstable potential Vd on the photosensitive drum, the photosensitive drum is positively charged under the influence of the transfer voltage. Therefore, in case an image formation is started immediately after (S8) the end of the peak-to-peak voltage selecting

step, such a positively charged area cannot assume a sufficient potential Vd during a first turn (S8-S9) of the photosensitive immediately after the start of image formation, thereby causing a defective charging in such an area (S8-S9). Also an error may be generated in the transfer voltage control since the control is executed in an unstable area. In order to avoid such situation, the transfer bias for the transfer voltage control may be applied after applying a charging bias for image formation during an additional turn (S8-S9) of the photosensitive drum thereby achieving a preliminary charging (S9), but such method requires an extension of the initial rotation step by a time T5, thus requiring an additional time for the image formation.

Please amend the paragraph starting at page 44, line 6 and ending at page 44, line 9 to read, as follows.

In the present embodiment, the image forming process and the charging bias control method are the same as those in the embodiment 1 and therefore, will not ~~not, therefore,~~ be explained further.

Please amend the paragraph starting at page 45, line 9 and ending at page 45, line 15 to read, as follows.

Figs. 7A and 7B show an operation sequence chart of a main motor, a charging and a transfer of the image forming apparatus of the present embodiment, and a flow chart thereof, respectively in a mode with an ordinary transfer material and in an initial rotation extending mode for example in a case of passing a thick paper as explained above.

Please amend the paragraphs starting at page 47, line 4 and ending at page 47, line 21 to read, as follows.

Also in case of executing ATVC control or the like as in the embodiment 2, the weak bias application for ATVC control is extended for T8. Since an application of a strong positive voltage such as a print bias to the photosensitive drum may generate ~~generates~~ a memory on the surface thereof by a positive charging, the application of the print bias is preferably executed at S14 immediately before the image formation, thereby minimizing the time of application of such high positive voltage.

Embodiment 4

This embodiment defines a discharged charge amount caused by the foreign substance eliminating bias employed in the embodiments 1 to 3, thereby improving a foreign substance eliminating property on the drum surface. Other configurations are the same as those in the embodiment 1 and therefore, will not ~~not, therefore,~~ be explained further.